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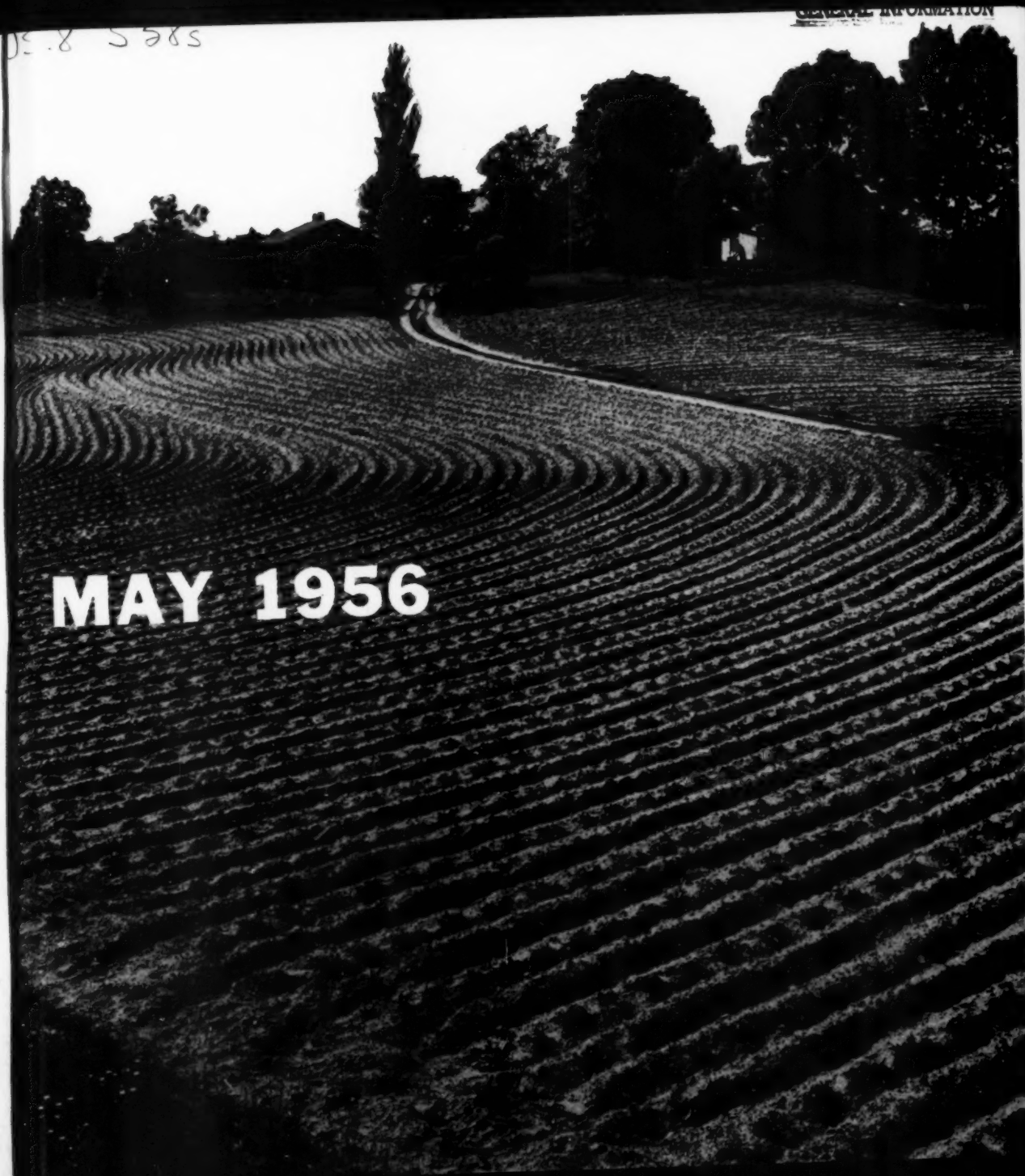

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SOIL CONSERVATION

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SECRETARY OF AGRICULTURE

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U. S. DEPARTMENT OF AGRICULTURE, WASHINGTON, D. C.

★ THIS MONTH ★

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IMPROVEMENT OF WOODLAND PAYS.—Norman Hobgood of Arkadelphia, Ark., remembers when the pine trees on his 6 acre woodlot were seeded naturally and received scant attention.

In 1921 this 6-acre field, then badly eroded and worn out, produced only 80 pounds of seed cotton. In 1922 the field was taken out of cultivation and nature seeded it to pine trees.

It was not until 1946 that Hobgood began to manage the trees as a crop. At that time, with the assistance of Soil Conservation Service technicians, he made the first real thinning. The net return from this cutting was $103.50, or $17.25 per acre on land that cost him $5 an acre.

In 1950 he netted $60 from the sale of saw logs and $25 from the sale of fence posts on the 6 acres. In 1953 he sold $21.50 worth of pulpwood. These cuttings were done on a thinning basis with Hobgood selecting the trees to be cut.

Today the once badly eroded, unproductive soil is covered with a fully stocked stand of thrifty pine trees up to 18 inches d.b.h

Editors are invited to reprint material originating in this magazine.

FRONT COVER—Contour row grade layout of tobacco field in North Carolina.

All orders go to the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

For the Land's Sake— Keep It Covered

A successful businessman of western Kentucky also became successful as a grassland farmer on land that was once thought to be nearly worthless.

By NORMAN TERRY

JOHN PARKS has certainly followed the Graves County slogan, "For the Land's Sake Keep It Covered," and made it practical, for the man's sake to keep it covered.

Parks has taken 217 acres of neglected, run-down land and by grassland farming methods changed it into one of the most profitable farms in western Kentucky.

Most any month of the year you drive by this farm you will see fat sleek cattle grazing the lush green pastures. In the barn you will probably see thousands of bales of hay that were produced on the farm.

John Parks took the back end of two run-down farms and changed them into a productive, profitable showplace of conservation farming. He was awarded the outstanding conservation farmer award of the Graves County Soil Conservation District in 1955.

Note.—The author is area conservationist, Soil Conservation Service, Mayfield, Ky.

Parks was reared on a 90-acre farm in Calloway County. He left the farm at 14 to work in a hardware store in the county seat town of Murray for a year, then went back to the farm for a year. By this time Parks saw a need for more education, so he went to Valparaiso University for 2 years, and worked to pay his expenses while there. The next 3 years he worked in a factory and store, saved some money and went into ten-cent store business for a year, then skating rink business for a year. Then in 1917 he went to the Army. After the war he became an automobile dealer, and has been ever since.

All this time and through all these changes the thing foremost in his mind was farming and his love of the land. So, in 1921 he acquired his first farm.

From 1931–33, after becoming a very successful businessman, the urge to become a large farmer got the best of him. Parks bought for 20 to 40 dollars per acre, on credit, 1,065 acres of thin, eroded hill land.

John Parks and part of his cattle on his grassland farm.

In the next few years these farms were paid for from dairy profits of milking 120 cows.

In 1933 Parks became one of the first cooperators with the Civilian Conservation Corps. The erosion control camp helped fill gullies, build brush and concrete dams, contour fences, contour furrows, diversion channels, and in addition to all these practices he terraced more land than anyone else in Graves County. At that time his farms were producing 20 bushels of corn and about one-half ton of hay per acre. In 1933 he started liming these fields and in 1936 started using phosphate.

By 1939 practically all this land had received the full treatment. The farm was looking good and yields of crops had more than doubled. Parks started selling land that year and soon sold all but 217 acres.

In 1941, when the Graves County Soil Conservation District was organized, Parks decided to do something with his remaining gullies and land. He called on the district and told the supervisors he wanted help to keep all his soil

Equipment used in fertilizing, liming, and reseeding pastures and meadows on the Parks' farm.

and water at home, and to get the land to producing something he could sell. First, a soil survey was made to show slope and suitable use for the land. Soon Soil Conservation Service technicians began assisting Parks in working out a farm conservation plan. Much of his land is Class IV, VI, and VII. Most of the land was planned for seed, pasture, and hay production. Outside the garden there hasn't been any cultivated row crops on this farm since 1942. Beef cattle are used to market the hay and pasture.

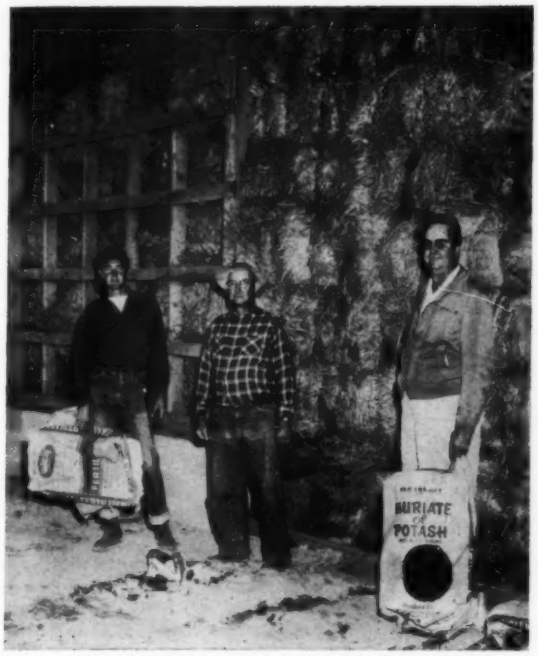
Asked why he didn't use any cultivated crops Parks replied, "I don't believe in cultivated crops for there is too much soil loss and considering this, plus the cost of treating and seeding back to grass, it is a losing proposition. Why, I only made 110 bushels per acre on my last corn crop, and that wasn't as profitable as my other fields that were producing grass and legume seed, hay, and pasture. If I could economically maintain this high yield year in and out, like they can in the Corn Belt, it would be all right, but I can't compete with Corn Belt farmers in growing row crops."

In 1955 Parks grazed 170 head of cattle while producing more than 34 tons of hay, 300 bushels of wheat, 975 bushels of oats, 4,000 pounds of Ky-31 Fescue seed, 9,000 bales of hay, 600 bales of straw, and 4,000 pounds of Kobe lespedeza seed on his 217 acres. Last, but not least, 10 acres of this farm are 10 to 25 feet deep in water for livestock, irrigation, and fish production. More than enough fish and vegetables are taken from the ponds and garden for three families, so, many fish are given away to friends, and over $1,000 worth of vegetables a year are sold from the irrigated garden at the local market.

Parks says he gets four crops a year from some fields. For example, in 1955 he harvested oats from a 15-acre field, baled the straw, cut the Kobe lespedeza for hay, and later combined the Kobe for seed. Most Kobe fields in the county that were cut for hay that year didn't come back and make additional growth due to the drought, but this field, being high in organic matter, plant food, and water holding capacity snapped right back and was 8 to 10 inches high before it was combined.

Asked how he has been able to get these outstanding yields from land that was once so poor he replied: "I didn't do it by myself, Billy McReynolds, now in the Army, helped me 4 years. Joe Nolin, has now been with me for 3 years. Then the CCC Camp, Soil Conservation District, and Soil Conservation Service technicians have helped and guided me since 1933 in making my plans and establishing my conservation practices."

Of course he doesn't talk too much about clipping his pasture and using the weeds for bedding, which with the cattle produce more than 400 loads of manure a year. He seldom mentions using a tractor and scraper to put 6 inches of topsoil back on a steep hillside, or



Part of the 9,000 bales of hay produced on the Parks' farm in 1955.

terraces and diversion channels used on all fields to conserve soil and water, plus initial treatment of all land with 3 tons of lime and 200 pounds of 62 percent phosphate, and the top dressing of all fields each year with 200 pounds per acre of 4-12-8 commercial fertilizer and 100 pounds of 33 percent nitrate, 100 pounds of 62 percent phosphate, and 100 pounds of 60 percent potash, and other soil conserving and improving practices. This year in his white clover and grass fields he is drilling one-way rye grass and fescue, then is going to cross drill a mixture of oats and wheat. His next project for more conservation and production is irrigation of hay, seed, and pasture lands.

John Parks truly loves his land for he is on it every day and is daily doing and searching for ways to stop all erosion, conserve and best use all the water available, and to make the land even more productive and profitable.

Parks was the 1952 winner of the City Farmer division of the Save and Enrich Our Soil Contest, Memphis, Tenn., but even though he is a successful businessman he should not be classed as a City Farmer for he loves his land so much he now spends practically all his time out on the land, not in town.

Graves County leaders and farmers for many years have used the slogan, "For The Land's Sake Keep It Covered." John Parks has done this very profitably for 13 years. During the whole time, dry years and all, he has had a surplus of roughage feed, and one year produced more than 30,000 pounds of fescue seed.

TIMBER A PROFITABLE CROP.—Rex Ramsey of Nashville, Ark., has proved that pine timber is a profitable crop, even when started from "scratch." In 1940 Ramsey planted an old eroded 10-acre field to pine seedlings in accordance with his conservation farm plan worked out in cooperation with the Mine Creek Soil Conservation District. In 1950, just 10 years later, this pine plantation was ready for its first thinning. The timber was carefully marked and pulpwood removed from 8 acres. The other 2 acres had suffered fire damage and were not thinned. Pulpwood cut from 8 acres brought $150. Max Bolar, SCS woodland conservationist, recently cruised this plantation and made the following estimates:

Saleable timber products per acre

	Value per acre
20 cords pulpwood @ $4	$80.00
280 fence posts @ $0.06	16.80
	$96.80

Products to be removed in stand improvement cut

5 cords pulpwood @ $4	$20.00
120 fence posts @ $0.06	7.20
	$27.20

The total value of the saleable timber now present on this plantation is $96.80 per acre, which means that this 10-acre block has made Ramsey $7.65 per acre every year since it was set in pine. This timber is just now reaching the stage of growth that will produce saw logs and higher returns. Ramsey isn't going to sell out and take his $96.80 per acre because he knows that the value of his timber will increase much faster during the next 15 years than it has in the past 15. However, Ramsey will thin this plantation as suggested by Bolar and take a partial payment of $27.20 per acre on his investment. The remaining trees will be left in better condition for faster growth.

LONG-DISTANCE USE OF MAPS.—Commenting on the use of conservation plan maps, Ed. Small, manager of Cherokee County Farms, near Gaffney, S. C., which are owned by W. B. Camp and Sons, Inc., of Bakersfield, Calif., said, "We use our conservation plan maps to keep records in our California office on the Cherokee farms. Duplicates of these maps are kept at both places and in our correspondence we refer to the field numbers and land use practices."

Conservation Workshop for Teachers

By Ivah Green

"I 'VE lived on a farm all my life and knew about conservation practices on the land, but I didn't realize, until I attended this workshop, how much more than that conservation really means."

"I've always been interested in conservation of our natural resources, but until I took this course I had never been aware of its terrific importance from so many angles."

These two comments were chosen at random from 22 evaluation sheets written by elementary teachers on the final day of attendance at the conservation education workshop at Doane College, Crete, Nebr. The evaluations were requested, but not obligatory; they were unsigned.

In summing up the values of this workshop, we found these factors most important: The teachers attending had acquired a great deal of knowledge in a short time (11 days); they understood the urgency for conserving all natural resources; they recognized the close interdependence among all natural resources; and they achieved a new awareness of the spiritual aspect of our resource heritage.

Workshop students listen to soil scientist discuss gully erosion.

Note.—The author is director of the conservation workshop at Doane College, Crete, Nebr.

Ivah Green

The Doane College workshop in conservation education was started in 1950. It has been continued for six consecutive years. The seventh will be held in the late summer of 1956.

More than 150 elementary teachers have attended the Doane College workshops, a third of them sent there on scholarships provided by various conservation-minded agencies, mainly soil conservation districts and the Izaak Walton League. But implement dealers and service clubs also contributed funds toward scholarships. After attending the workshop the teachers spread out into their local communities, prepared and eager to do something about teaching (and preaching!) conservation of our natural resources.

The influence of such teachers is illustrated in a statement by Robert Mann: "Training a

teacher to teach conservation may be likened to energizing an induction coil—she attracts and motivates the generations of pupils that come within her magnetic field."

Each day's procedure for the 11-day workshop session was somewhat similar and yet varied enough to keep interest high. The 22 participants of the 1955 workshop listened to excellent lectures, and were taken on field trips closely connected with the lectures. They viewed the finest films and filmstrips which provided extra visual evidence for many of the ideas they received through lecture and trip. They browsed lightly and read widely in many books, periodicals, and pamphlets, chosen for their particular contribution to the fields in which the majority of the teachers had expressed interest.

Lectures and field trips included the following topics: Soil Structure; Land Classification and Use; Building and Holding Soil; Grasses and Legumes; Home Woodlands and Windbreaks; Wildlife Management on Farms; Irrigation Farming; Crop Rotation; Watersheds; and Gun Safety and Law Enforcement.

While the general pattern of conducting the Doane College workshop varies but little from year to year, the 1955 workshop did inaugurate two innovations: land judging and airplane touring. Both were successful enough to warrant their inclusion in the 1956 workshop.

The land judging practiced by 4-H boys and girls and FFA students is a fairly well known procedure for acquainting young people with a knowledge of soil, and the ability to appraise its characteristics and use capability in a farm planning operation.

For elementary teachers, some of whom had never heard the term before, land judging was a rather formidable assignment. But it took no more than four excellent speakers to give the basic background information necessary for a trial run in land judging for the workshop students. A concentrated course, surely, but definite and simply told, and illustrated with a variety of demonstrations which made the procedures less confusing.

Lloyd Mitchell, a soil scientist from the University of Nebraska, made soil structure and soil profiles meaningful. Two SCS work unit conservationists, Dexter Hawes of Beatrice and Ed Fitzgerald of Wilber, explained the reasons for, and the meaning of land classification. J. V. Cain, county agent from Wilber, cleared up some of the vague ideas about crop rotation and fertilizers. Evan Hartman, former extension specialist from the University's College of Agriculture demonstrated with water and various kinds of soil the meaning of light soil, heavy soil, organic matter, permeability, structure, and so on.

A soil conservationist explains and demonstrates some points to students of the Doane College Conservation Workshop in an outdoor classroom.

The first ventures in land judging followed the lectures and demonstrations. Students assembled at pits dug in different fields, and in a 103 degree temperature attempted to put into practice what they had learned so recently. While scores were far from perfect, no one seemed to find that as important as the fact that each had actually taken part in an activity which called for expert knowledge and good judgment. Land appraising, and use of land according to its needs and capabilities took on new values in their eyes.

A demonstration of water intake and runoff on different kinds of land by the Doane College Conservation workshop students.

"Watershed" was a vague term for many of the workshop students. While a few may have thought a watershed was a shed that housed a pump, others knew a little more but not much more about the real concept of the word, and still less about "watershed management."

When those teachers learned about the recognition given to Nebraska throughout the nation because of her pioneering in watershed management, the whole idea of watersheds took on greater importance. A capable speaker, Richard Tenhulzen, SCS representative, told how the Service works with the Salt-Wahoo Watershed Association. He gave a forceful talk about watersheds, and supplemented his remarks by showing the film "Valley Of Still Waters." Both helped considerably to lay the groundwork for the understanding necessary for students to see a subwatershed in operation on the ground. After the ground tour, they flew, two and three to a plane, over the whole subwatershed area.

In between the various activities which made up the workshop program each day, the teachers prepared materials for their own classrooms—a unit of work for a specific grade or grades. Individual interests in choice of subject showed up strong here, resulting in such topics for study as: All About Grass, A Homesite for Woody, Stocking a Farm Pond, Holes in the Ground, Schoolground Beautification, Saving the Whooping Cranes, The Water Cycle, The Value of Quail, and The Corn Borer: Its Damage and Control.

Each unit had to be based on stated concepts desirable for pupils to know. Each unit had to lead out with a written introduction in first person which would arouse the interest and curiosity of pupils sufficiently to cause them to ask questions that would result in study. Also included was a list of community resources important for study and suggestions as to how integrations might be made with other fields of subject matter commonly taught in the elementary classroom. Furthermore, there was a culmination of the unit in a manner that should prove to an interested audience the value of the study. Then, the unit contained a list of references, including films and filmstrips which the teacher expected to have accessible for her pupils when the unit was launched.

Not only did the writer of each unit gain value from the writing, but she was given time to present her unit in whole or in selected parts before the entire workshop group. Thus each member was given a look into 21 different units of study by which she could profit in case she wished to do similar units in her own classroom.

Teachers prepare study units for next year's classes while attending workshop.

Tree Girdling In Arkansas

By MAX D. BOLAR

SOMETHING new has been added to the soil conservation district program in southern Arkansas—the contract business of girdling cull and weed trees with mechanical girdling machines.

One of the first mechanical tree girdling contractors in the State was "Hap" Brotherton of Hope who commenced this service in the Hempstead County and Nevada County Soil Conservation Districts.

Brotherton is also the tree planting contractor for the Hempstead County Soil Conservation District. He plants almost a million trees each year. He purchased a mechanical tree girdling machine to keep himself employed between planting seasons. "Hap" and the girdler make an "Eager Beaver" combination with a record of girdling several thousand acres of cull and weed trees during the past year.

Other contractors became interested in girdling in the southern Arkansas counties. At present, they are operating in at least 15 Arkansas soil conservation districts—and the girdling service is rapidly spreading to other districts in the State.

The purpose of tree girdling is to kill trees that are slow-growing, diseased, or defective, and thus release desirable, faster-growing species from competition with the undesirable trees. For example, blackjack oak, which is overtopping or competing with pine, is girdled to make way for the fast-growing pine. The girdling operation has often more than tripled the board foot volume increase in pine and has saved the pine stand from stagnation.

Note.—The author is woodland conservationist, Soil Conservation Service, Hope, Ark.

"Hap" Brotherton of Hope, Ark., using a mechanical tree girdler on a cull tree.

Contrary to the belief of some, the girdling operation is not for the purpose of "declaring war on the hardwoods"—girdling can be used just as effectively to help the more desirable hardwoods. A number of farmers and woodland owners are finding that hardwood forests may be improved by girdling cull and weed trees to make way for high-grade hardwoods.

Soil Conservation Service personnel in Arkansas found that the job of promoting timber stand improvement by girdling or otherwise eliminating cull trees, seemed to be bottlenecked. While many farmers and woodland owners agreed that there was a definite need for this woodland improvement work, they lacked the time or physical ability to do the work with an ax. The mechanical tree girdler can operate about four times faster than a good man with an ax, and the cost is only about 3 to 5 dollars per acre.

The mechanical tree girdler cuts a 1-inch wide band around the tree to a depth of slightly more than a half-inch. On bottom land and moist sites there is a tendency, as with ax-girdled trees, for the tree to sprout or to bridge over the girdle. Sprouting can be controlled by painting the groove with a mixture of 2-45T and old crankcase oil.

REGRASSING WIND-ERODED LAND

The Normans of Seminole, Texas, find that planting good grass on their sandy, blowing fields is more profitable than planting cultivated crops.

By W. S. Goodlett

USING land for the purpose to which it is best suited is paying off in more ways than one on the 19,520 acre Flying N Ranch in Gaines and Andrews counties in West Texas where wind erosion is a serious problem.

Youthful George Norman, Jr., who took over management of the ranch when his father died, has learned that reseeding of old cultivated fields to blue panicum and lovegrasses not only eliminates soil blowing, but also protects his cattle against being poisoned by grazing shinnery, a type of small scrub oak.

The elder Norman started building the Flying N Ranch in 1943, buying numerous tracts of range land and several old cultivated fields, eventually creating two units, one of 6,080 acres and the other 13,440 acres.

Cotton, grain sorghums, and other crops had been grown on the sandy cultivated fields, so the elder Norman continued to farm them until drought set in and blowing started. He realized that he needed assistance in solving the wind erosion problem, so he became a cooperator of the Gaines County Soil Conservation District in 1949.

In 1950, weeping lovegrass was planted on 70 acres, and sand lovegrass on another 65 acres. These pastures were grazed from February 1, 1951, to March 15 by 124 cows and 60 calves. The pastures were rested until April 24 and then were grazed by 100 cows and 50 calves until July 26. Good gains were made by the cattle without supplemental feed. From July to December around 12 to 15 cows were grazed. The grass made no seed, but the cattle came off in good condition.

Drought really set in in 1952, but the pastures provided grazing for 100 cows and 50 calves from April 1 to June 15 and 54 cows and 50 calves were grazed from June 22 to July 17. Although there was little rain and the grass was grazed short, 1,900 pounds of uncleaned seed were harvested from 40 acres of blue panicum.

The elder Norman was so well pleased with results from the grass in controlling erosion and providing feed, that in 1952 he made additional plantings of 250 acres each of weeping lovegrass and blue panicum on dry land, and 55 acres to blue panicum on irrigated land. However, about 50 acres of the dry land blue panicum were blown out.

Note.—The author is area conservationist, Soil Conservation Service, Big Spring, Tex.

In 1953 there was less than eight inches of rain, most of which came late in the growing season, so the dry land grasses didn't do very well and little grazing was provided.

Two rains, one of about 2½ inches in September of 1953 and the other of about 3 inches in April of 1954 got the grasses off to a good growing start. On April 26, 1954, 148 cows, 5 bulls, and 75 calves were put on the regrassed lands that had been divided into 5 separate pastures. The irrigated pastures were given an additional 3 inches of water. He started grazing these cattle on a 165 acre block of weeping lovegrass. They stayed in this pasture for 2 months and came off in very good shape. There was still a good growth of weeping lovegrass when they were moved.

On approximately 200 acres of the dryland blue panicum, he harvested 22,000 pounds of seed and on about 400 acres of dryland weeping lovegrass, approximately 100 pounds of seed were harvested. These grasses were grazed after the seed was harvested. The grazing Norman's cattle got from his revegetated land, enabled him to give all of his native pasture land a much needed rest during the growing season. This allowed the native grasses to make a comeback following the drought.

In July 1955 Norman planted approximately 800 acres more of blue panicum. One field of 240 acres was washed out by a heavy rain but the rest came up to stand. He plans to replant the washed out field and additional acreages this year and eventually have all of his cultivated land in grass.

The program now provides for grazing pastures in rotation at the rate of three cows per acre for one week. "This type of operation not only is proving profitable in providing livestock feed, but also is eliminating wind erosion damage on the regrassed sandy land," young Norman points out.

George Norman, Jr. (left), ranch owner, and Len Dugan, SCS conservationist, discuss possibilities of a weeping lovegrass pasture on the Norman ranch.

"Another highly important feature," he says, "is the fact that the introduced grasses green up earlier in the spring than do the native grasses. This furnishes grazing for the cattle during the spring when the shinnery on the range land is budding."

The shinnery, which infests the sandy range land, buds in the spring before the native grasses become green. The buds have a heavy content of prussic acid, which is fatal to livestock. Cattle will graze the shinnery, since there is no green grass in the early spring, and hundreds are fatally poisoned annually. Norman recalls that they lost 45 head of cattle in 1952 from shinnery poisoning.

(Continued on page 232)

Part of the cattle herd on the Norman ranch.

Rainmaker Helps Prove a Theory

No. 14

This is the fourteenth of a series of articles to appear from time to time in explanation of the various phases of research being conducted by the Department of Agriculture on problems of soil and water conservation.

By FRANK RAUZI and A. W. ZINGG

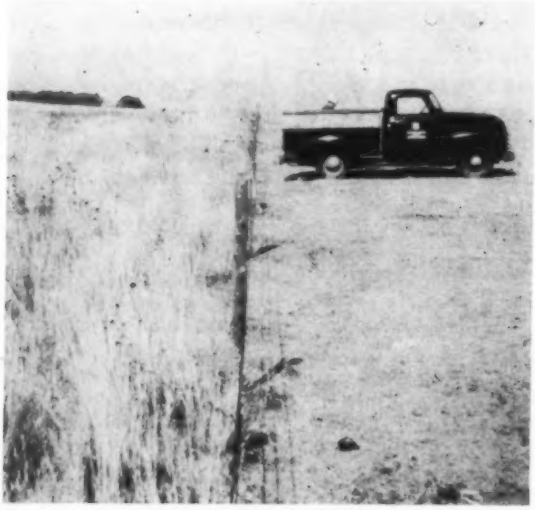
GOOD stands and high production of grass on the range help maintain good stands and high production.

Where there is good vegetation, any type of soil can resist erosion and absorb torrential rainfall better than where vegetal conditions are poor.

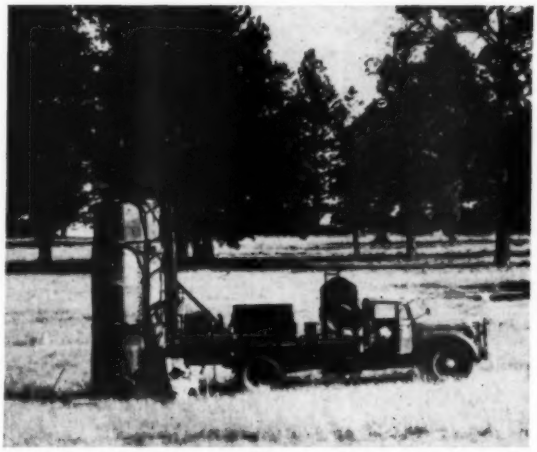
The facts are now available to support these statements.

During the past 5 years a portable rainfall machine has been used to get these facts about rangelands of the central and northern Great Plains. More than 900 manmade rainstorms have been applied in making the studies. These tests have been conducted over a 7-state area from the northern Rockies across the Plains to the Flint Hills of eastern Kansas. Different kinds of range with wide contrasts of cover conditions have been sampled.

Note.—The authors are, respectively, soil scientists and soil conservationist, western soil and water management section, soil and water conservation research branch, Agricultural Research Service, Laramie, Wyo.



The range on the left had an intake rate of nearly 3 inches of water per hour while the one on the right had an intake rate of about 1.2 inches per hour.



Portable rainmaking machine used to determine soil-intake rates of water on rangeland.

Research on the water intake rates of rangelands has been done through a joint effort of the Agricultural Research Service and the Soil Conservation Service cooperating with the State Agricultural Experiment Stations. Home base for the rainmaker is at the University of Wyoming, Laramie, Wyo. Locations on which the machine is to be used are scheduled each year. Existing fence line contrasts between cover and range conditions are located by range technicians and soil scientists of the SCS. Data are then obtained on tours with the rain machine by personnel of ARS.

The rainfall applicator is mounted on a truck that can be taken almost anywhere cattle and sheep can graze. Water is pumped from a tank and sprayed on a drip screen at a height of 8½ feet above the site being tested. Originally, forming drops of the right size and spacing was a problem. It was solved by placing muslin cloth over three-fourth inch chicken wire. When water is sprayed on the muslin, it is caught in small pockets over each screen opening. Yarn

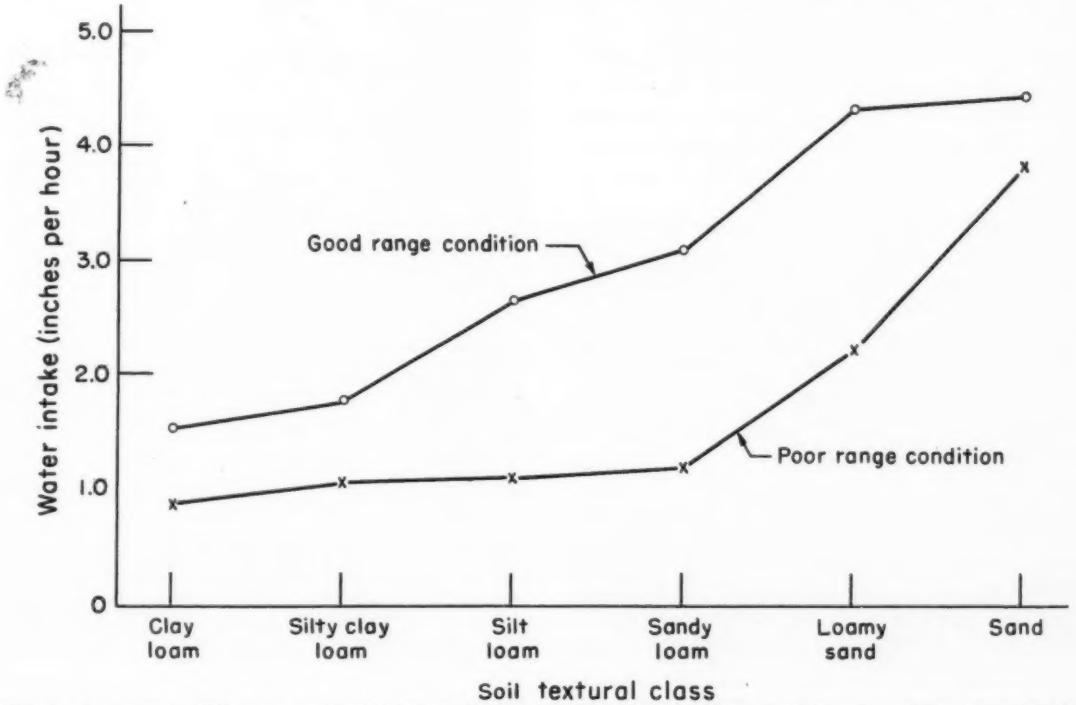
is attached to the muslin to protrude through each hole in the wire. Water accumulates on the yarn to form raindrops. A canvas prevents the wind from deflecting the rain, and the water falls on an area of 13 square feet. A 2-foot square metal frame is driven into the ground near the center of the area of the "storm," and measurements of runoff are made from it. "Rain" is normally applied for 1 hour. The amount of water going into the soil and the amount of runoff are measured at the end of 30 minutes and again at the completion of the 1-hour test. Usually the amount of water applied is 3½ inches. Rates as high as 5½ inches have been used on coarse sand.

Ranchers sometimes laugh about the unusual research device and call it a leaky silo or a portable shower. However, there is nothing funny about the results obtained. The data are of great value in determining how much moisture can be conserved and used for greater grass production while providing erosion protection to the vast expanses of range in the Great Plains region.

The chart below shows the differences in water intake found on soils of different textures. It shows that the average intake rates on heavy soils of either clay or silty clay loam are relatively low. The rate of water intake is increased appreciably, however, even on these heavy soils when they have good grass cover. For me-

(Continued on page 240)

Metal frame and spout that measures difference between water applied and runoff.



Effect of range condition on water intake of different kinds of soil in the central and northern Great Plains.

TRIPLE PURPOSE DITCHES

The McCabes use the same ditches for drainage, surface irrigation, and sprinkler irrigation.

By WILLIAM R. RATLEDGE

THERE'S a big argument on at the service station in Selbyville, Del. Emory McCabe, Sr., and his son started it when they said they could make their farm ditches do triple duty: (1) drain, (2) irrigate and (3) cut operating costs. The argument is spreading as water "experts" look the ditch system over. Doubters are weakening as the evidence begins to support the McCabes.

The Summer of 1954 was as dry in Selbyville as in the rest of the country. So the McCabes joined with the nation's farmers in a swing to irrigation. They already had drainage ditches. Young Emory came up with a novel idea. "Dad," he said, "we've got our main ditches already. All we need is a good well and sprinkler equipment. Then we'd be fixed to irrigate."

The McCabe ditches were dry most of the 1954 summer. One of the hurricanes, however, produced enough water to fill the ditches and let young Emory test his idea. He held an irrigation demonstration with a portable pump. The McCabes found that a sprinkler system could be set up in minutes anywhere within their 50 acres of blueberries and on almost 50 acres of other crops.

By the time a threat of drought arrived in the spring of '55, young McCabe had his complete water control and distribution system in operation. He had drilled a 10-inch well, 118 feet deep, rated at better than 1,000 gallons a minute. He had installed a vertical turbine pump to deliver up to 600 gallons a minute to the ditches.

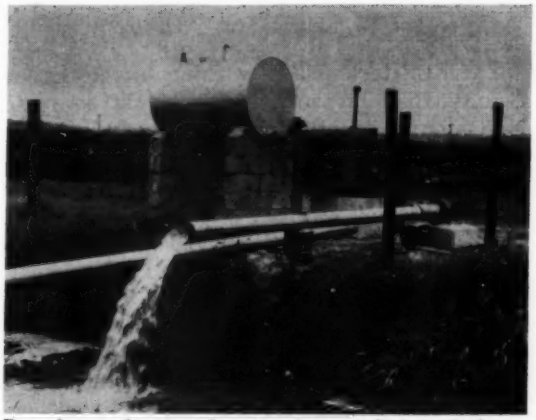
Note.—The author is a Soil Conservation Service technician engaged in watershed work in Delaware and Maryland.

They are not ordinary ditches that the McCabes have. They are big ditches with a capacity of nearly 2 cubic yards per foot. But what is more, they are equipped at the outlet ends with creosoted water control structures. Flash boards can be added or removed to permit either storage or drainage of water.

The McCabes don't recommend using ditches for main irrigation lines everywhere. In their case, however, ditches are necessary for water control. Putting the ditches to work as water reservoirs and distribution channels was a natural.

By using the ditches as main lines the McCabes figure they are saving a lot of money since they can reach nearly 100 acres with only 300 feet of 6-inch main line irrigation pipe. They also figure a big saving in power, pump, and operating costs because of limited pressure loss in the main line.

Emory S. McCabe, Sr., watches underground water flow through a movable pipe from a pumping station into his drainage-irrigation ditch.



Pumping underground water from well into drainage ditch for irrigation.

Since the farm is normally well supplied with moisture during the growing season, the irrigation system is designed mainly to produce quality fruit and to get young nursery stock off to a good start. A centrifugal pump which operates from the power-takeoff of a small tractor is large enough to provide 1 acre-inch of water every 10 days to the 50 acres of blueberries when the sprinkler system is used.

The McCabes increase efficiency by eliminating the sprinklers in the older berry plantations. They can do this because blueberry culture develops a ridge and channel with the bushes on the ridge. The channels are developed at right angles to the drainage-irrigation ditches so that excellent surface drainage results. The McCabes have built aluminum baffle-boards that fit the contour of the ground between rows. These "boards" serve as dams to permit flooding between the rows thus avoiding the need to move pipe as required for the sprinklers. Flooding also puts the water where it is most needed—at the roots of the plants.

The senior McCabe's interest in water control began 20 years ago when he bought the swampland farm just as the Civilian Conservation Corps finished cleaning out the Sandy Branch tax ditch near Selbyville. He found that the black soils would produce excellent corn and soybeans if they did not flood during summer storms. The new main ditch held out fresh hope for flood relief. It promised some field drainage but not enough to permit use of the heavy farm machinery which was rapidly replacing the mule and hand labor.

After 10 years, Emory, Jr., joined his dad in the farm enterprise. The father and son team had heard that blueberries would grow best on wet acid ground well supplied with humus. Blueberries sounded like the answer to their water troubles. The neighboring woodlands were full of wild varieties and outsiders were reported seeking soil similar to that of the McCabes for berry production. They were supposedly tolerant of wet feet all winter, resistant to summer flooding, and even able to endure hot dry weather.

Yes, blueberries would tolerate all of these things and the soil would produce good fruit. But the McCabes were interested in making a living and even a profit from the land and the blueberries. Profit demanded more than mere tolerance; so the McCabes set out on their water control venture.

In 1947, E. S. McCabe and Son became cooperators with the Sussex County Soil Conservation District. With the help of Soil Conservation Service technicians, they developed a drainage plan using parallel ditches to remove excess water. The idea that blueberries liked wet feet so persisted that they installed only part of the plan. More than that, they sandbagged the ditches shut during the summer months to prevent loss of water. Thus began their first effort at mechanical water control.

During the next 2 years, the McCabes noticed that the blueberries adjacent to the deep ditches

Pumping water from drainage ditch to irrigate field crops.

were making excellent growth while stunting was taking place in other parts of the fields. As a result of this evidence the McCabes installed a series of parallel drains. The soil conservation district helped with the job. The McCabes built more than 3 miles of ditches just like the neighbors' cropland ditches.

The McCabe ditches, however, soon became different because each ditch serving the blueberry fields was fitted with a concrete pipe at the discharge end. They installed a flap gate over the pipe opening and cut a hole in the top to serve as a "drop inlet." The flap gates allowed the ditches to drain in the winter and permitted water storage during the spring and summer.

In 1954 the McCabes began tinkering with their water control structures again. The concrete pipes with the hole on top worked all right but the diameter of the pipe limited the amount of water held. Last year there was little rain after the gates were closed and the "held" water soon seeped into the ground. The McCabes tailored the ditches for new water-control structures of creosoted timbers keyed into the banks. The structures were equipped with flash boards so that the water level could be held at any desired depth or drained.

What's the argument about? The McCabes contend that holding water in the ditches helps control the water table under the blueberries. Others say that the practice has little effect on the movement of water in the soil. Some of the neighbors think like the McCabes; they have made plans to install control structures in their ditches.

There's also an argument about water loss from the ditches. The McCabes don't fear great loss of water by evaporation because the water surface is protected from wind action. They are aware of possible heavy seepage loss in midsummer after the normally high water table drops. They think that trapped runoff will more than make up for seepage loss. The answer to this question will come this summer if rain is as scarce as it was last year or if it is poorly distributed.

The McCabes see other advantages to keeping the ditches filled at some seasons. Flooding helps control the growth of weeds in the ditch bottoms. They can also control some of the water weeds by drainage at certain seasons, if necessary.

The SCS technicians working in the Sussex County District are being called in again to help out on a couple of technical problems. The McCabes have built their water-control structures with much leeway for fear of storm damage. They want to know the maximum height of water they dare hold in the ditches with their flashboards. They are also curious to hear what the technicians have to say about the lateral movement of water from the ditches into the fields and from the fields into the ditches.

The McCabes are sure of two things: (1) ducks have begun pitching in their ditches and muskrats are burrowing in the ditch banks; so the farm wildlife is increasing; (2) if all of the farms on the main drainage ditch used water control structures similar to theirs, there would be less flood damage along the main stream during high runoff storms.

In the late spring, the McCabe farm is a study in contrasts. The drainage ditches in the corn and soybean fields are at work removing water to encourage deep rooting of the plants. In the bearing blueberry fields, the ditches are held two-thirds full to maintain a high water table. In the fields newly set in blueberries, irrigating sprinklers are drawing water from ditches and the ditches in turn are being recharged with water from the well.

Triple purpose ditches? At least that and maybe more. Who knows what the McCabes will do next?.

REGRASSING WIND-ERODED LAND

(Continued from page 227)

"When a rancher in a shinnery-infested area doesn't have pastures for his cattle in early spring, then he must do one of two things," the young rancher explains. "He must put his cattle on expensive feed until the danger from shinnery buds is past, or he has to leave them alone and take a chance on losing some of them."

The Flying N herd was considerably reduced during the drought years, but is being expanded in proportion to the feed provided by the pastures, Norman says.

Research and Operations—Technicians Get Together

By M. L. DuMARS

FARMERS, and the technicians who help them, are constantly on the lookout for more economical ways of draining land. In areas where irrigation is new, farmers and technicians are asking themselves what type and size of irrigation system they need, if any, to fit their weather, soil, available water supply, and desired cropping system.

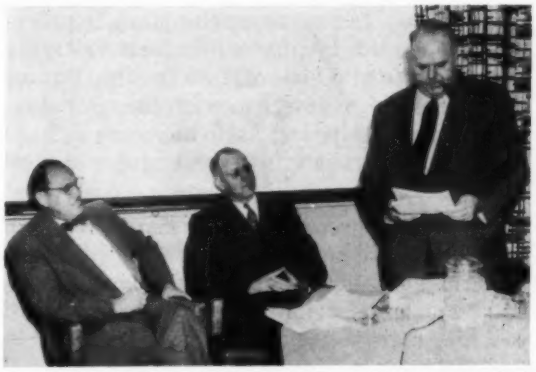
From those general questions stem thousands of specific, technical problems that have to be answered one way or another by the farm planners, county agents, engineers, and soil scientists who help the individual farmers and groups who decide to invest their money in new systems or improvements for drainage or irrigation.

To make sure the answers provided by the Soil Conservation Service are the latest and best that experience and scientific research can provide, operations and research technicians have to keep in close touch with each other through writings, individual contacts, and technical conferences.

Engineers and soil scientists responsible for both operations and research in the eastern part of the country (along with a few from the West) met in Chicago last December. The conference was planned and conducted jointly by the Soil Conservation Service and the Agricultural Research Service. Conference leaders were Tyler Quackenbush and John Sutton, irrigation and drainage engineers of the Washington SCS staff, and T. W. Edminster and M. D. Thorne, drainage and irrigation research projects, eastern soil and water management section, ARS.

Note.—The author is ARS-SCS liaison officer, Plant Industry Station, Beltsville, Md.

Comparing notes at the SCS-ARS drainage-irrigation conference are (left to right): Tyler Quackenbush, Marlowe Thorne, John Sutton, and T. W. Edminister.



Some principals in the SCS-ARS conference are (left to right): Cecil H. Wadleigh of ARS and C. J. Francis and J. C. Dykes of SCS.

A somewhat similar session for the West was held in Denver early in 1955, and another western conference is now being discussed.

What did the Chicago conference achieve?

First there was forward-looking discussion of the advances being made in the field of soil-water-plant relations and in the application of climatological data to drainage and irrigation problems.

Then in separate sessions on drainage and irrigation, the conferees took up detailed reports of the work being done, problems of applying the findings in actual farm situations, and recommendations for future research. Round table discussion of each item assured all participants the opportunity for complete understanding.

Sutton sums up the conference results for SCS drainage men like this:

"Getting our men together with the ARS men for 3 days of detailed discussion of the research work underway and of our research needs was most valuable. Aside from the important matter of getting better acquainted with the work being done, it gave us an opportunity to look at and discuss data not yet ready for publication—in other words, it was a look at 'things to come.' This gives us a chance to make better plans for the future.

"Of greatest importance, however, the drainage engineers came up with a list of 15 drainage research needs which should have top priority These will, no doubt, be of value in developing future recommendations for research.

"Not all the advances in drainage practices come through formal research. Many improvements take place by progressive farmers trying a new method and finding it successful. But we need the help of research men in observing, analyzing, and publishing such improvements as come about through farmers trying out new practices."

Edminster agrees that the drainage research program should be strengthened to answer SCS research needs. He points out that many needs will be at least partially met by research projects now underway.

Edminster further comments on the meeting:

"An outstanding example is a new project being initiated at North Carolina to study, under controlled conditions, the exact drainage requirements of various crops under different soil and climatic conditions. This will be a direct answer to our requirements for an improved basis upon which drainage designs may be developed. The recently established project in New York in which new subsurface drainage materials and installation practices are being studied should provide important information to enable us to reduce the cost of drainage and thereby increase efficiency in farm operations.

"The Chicago meeting provided a means of assuring ourselves that research and operations were on common ground and in full agreement as to the nature of the problems under study. The detailed discussions also resulted in each group having a better appreciation of how research data are being applied to field problems and where there is need to obtain new data or modify old data to more fully meet these problems.

"It was particularly gratifying to all the research men to find how closely their program objectives and plans coincided with the more pressing research needs as presented by SCS. It seemed obvious that the men in both Services were keeping in close contact with each other to the point where there were common points of view."

In Thorne's opinion, the results of the conference will be found in future research. He says: "We have received some fine suggestions for changes in and additions to our irrigation program and have been enlightened considerably on the problems of application of our data. This comes early enough in the program for Eastern irrigation that the suggestions can be readily incorporated in future work. It has been gratifying to get assurance from the SCS people that the work we are doing is that for which they have urgent need."

Quackenbush feels that the conference aided materially in speeding up the application of research results to the farm.

"Before research findings can be applied to the farms of the United States on a wholesale basis," he points out, "it is often advisable to make further limited studies on a field trial basis. As a result of the Chicago meeting, several items were brought to the attention of SCS personnel that are now ready for field trial studies. Plans were made for the Soil Conservation Service and the Agricultural Research Service to work closely together in carrying these research findings from the plot to the field trial stage of development.

"The personal contacts and discussions with the researchers who are getting the answers for us were certainly beneficial and should greatly facilitate exchange of information and ideas in the future."

J. C. Dykes, SCS assistant administrator who took part in the conference, sums up his views in customarily succinct language: "We need to do more of this."

A Long Time and a Lot of Work

It took the sponsors of the Agrarian Canal Irrigation Project 37 years to reach their objective, but they made it.

By AMOS L. OLESON and C. KEITH MILLER

"IT took a long time, a lot of hard work, and plenty of determination, but it's a success now and we don't have a big debt to be paid off in the future," declares J. G. Davis of Emblem, Wyo., when he refers to the Agrarian Canal Irrigation Project.

The project is about 8 miles west of Greybull, Wyo., and includes 1,622 acres of former desert land which has been developed for irrigation.

Note.—The authors are, respectively, work unit and area conservationists of Soil Conservation Service at Greybull and Worland, Wyo.

J. G. Davis inspects a field of beans he and his son, Jonathan, raised on land irrigated by the Agrarian Canal.

A combination headgate-wasteway structure on the Agrarian Canal.

Davis and his son Jonathan, own and operate 162 acres in the project area, in addition to a farm on the Emblem Bench. Davis is generally recognized as "father" of the project. He has seen this land developed from an area of salt sage, prickly pear, and scattered sagebrush into a prosperous irrigated section where yields of 6 tons of alfalfa, 20 sacks of beans, or 70 bushels of barley to the acre are common.

"We had a rough time during the early years," Davis says, "but since the organization of the Greybull Valley Soil Conservation District and with their help under the group enterprise procedure, we think we have our problem licked. The technical help the SCS technicians cooperating with the district have given us in planning, laying out, and constructing our irrigation canals and system has been invaluable."

Davis recognized the possibilities of the project soon after he settled on the Emblem Bench in 1908, but it wasn't until 1918 that he was able to interest enough people to organize the Agrarian Canal Company and file the necessary application for a permit to appropriate water. The source of water is Dry Creek, an intermittent stream that drains part of the Emblem Bench, an irrigated section 4 miles west and the location of Davis' original homestead.

The original application included 2,100 acres, 896 acres of which were Carey Act lands and the remaining 1,204 acres homestead filings.

Davis is the only remaining settler of the original 10 applicants.

Construction of the necessary canal, involving 7½ miles of ditch, was started in 1918. Work was done mostly with teams and scrapers during the late fall and early spring each year until 1930. The settlers were all farming on the Emblem Bench, which took most of their time during the growing season. A used dragline was purchased in 1931. During that spring and summer construction of the canal was completed. The first water was delivered in 1932, but because of drought and canal problems there was enough water for only two farming units. During this period many of the original applicants became discouraged. They either sold their interest in the Carey Act land or defaulted on their homestead filings.

From 1933 to 1937, only the Martin Fiene unit was farmed intermittently. In 1940, however, a storage reservoir known as the Sushine Reservoir was completed. This assured an adequate supply of water for the Emblem Bench and, as a result, a more dependable supply for the Agrarian Canal Project.

Encouraged by the increased water supply the remaining settlers broke out additional acreage and worked with renewed vigor. During the middle of the growing season in 1941, however, there was a complete failure of a wooden flume carrying the entire supply of irrigation water across a large gully. The resultant loss of the entire crop caused the abandonment of dwellings and cessation of all activity on the project.

"Things were at a low ebb during this period," Davis recalls. "Especially in 1946 when Mrs. Wamhoff, one of the settlers, was notified she had to prove up on her homestead that year or it would revert to the government."

In order to prove up on the homesteads the land had to be broken out and farmed. This required an adequate source of water. "Well," says Davis, "we got all the interested people together and held a council of war. When we discovered that technical assistance was available from the Soil Conservation Service through the Greybull Valley Soil Conservation District, which had just been organized, we were elated. The Agrarian Canal Company was reactivated. We decided to complete and rehabilitate the entire project."

The company applied to the supervisors of the district for technical assistance under the group enterprise procedure. Complete surveys were made by SCS technicians. Cost estimates were drawn up and a 5-year plan of construction was agreed on.

In the fall of 1946 the canal company made an $8 an acre assessment on all irrigable land and entered into a contract for the construction of almost 3 miles of additional canal and an 18-foot cut to replace the wooden flume. Construction was completed late in 1947. In 1948, the settlers were back in business, in a limited way it is true, because the canal company ruled that only 25 percent of the land could be cultivated the first year. This limitation was be-

Some of the equipment owned and operated by Greybull Valley Soil Conservation District

cause of the need for more work on the canal. The SCS technicians also recommended that only a part of the project be broken up each year to avoid creating severe wind erosion hazards.

In 1949, a contract was let for reconstruction of another 3½ miles of canal, which completed the project. The canal company raised the limit to 50 percent of each unit that could be cultivated in 1949.

Today, the project includes 1,014 irrigable acres and plans have been made to add an additional 608 acres. These lands are owned and operated by nine families. The cost of developing the project to date is approximately $30 an acre.

Increase in production through irrigation of these former arid lands has been a benefit to the Greybull community in many ways. It helps provide a stable income for the settlers, the schools, churches, businessmen, and others in the Greybull community not only for the present but for the future.

Drainage Pays In Wicomico District

By Morris R. Nichols

"WITHOUT drainage ditches we can't farm this flat country," according to Thomas C. Calloway who farms on the Eastern Shore of Maryland near Salisbury.

The number of Eastern Shore farmers who feel the same way is growing year by year.

Calloway started his drainage program about 3 years ago. He has two more years work ahead to complete his drainage system. He has invested about $6,000 in drainage work and land clearing on his 280-acre farm.

Calloway used to get around 25 bushels of corn an acre. Now he gets about 75 bushels. "We used to think we were doing something when we got 8 to 10 bushels of soybeans an acre," he said. "Now we're not satisfied with less than 25. And the beans are of much better quality. Production is up at least a third all along the line."

Besides corn and soybeans, Calloway raises truck crops, hogs, and sheep. As part of an overall soil conservation program, he thinks drainage is of most importance on flat land, like his. He and his young son Bill plan to maintain their drainage system carefully once its general design is completed.

In the past 5 or 6 years, George and Joe Davis have invested nearly $10,000 in draining their farmland near Salisbury.

"Drainage is the best investment we have on our farm," George Davis said. "Already we have our entire investment back."

The Davis brothers raise corn and soybeans. In 1954 they won second place in Wicomico County with a corn yield of 85 bushels an acre.

They have drained about 150 acres. They have cleared brush and worthless trees from 50 acres of wet land as part of their drainage work.

"We haven't lost a crop since draining the land," George Davis said. "The previous owner used to lose his crop 3 out of 5 years."

District-owned dragline clearing drainage ditch.

Note.—The author is work unit conservationist, Soil Conservation Service, Salisbury, Md.

"You can't grow corn in water," says Linwood E. Richardson who farms at Willards with his son Glenn. "We used to dig ditches with a spade. Surveyed the land by eye to determine where and how deep the ditches should be dug. Of course the ditches weren't very good. They didn't do the job right. Today Soil Conservation Service engineers lay the drainage system out with us. So, it's done right. A modern dragline owned by the Wicomico Soil Conservation District does the work.

"Before we put in drainage, farming was more of a gamble than it needed to be. We could never be sure of getting into some of our fields. Maybe we'd get a little crop, maybe we wouldn't get anything. Now production is up and it's dependable. Yields will still vary with the weather to some extent. If there is a long and heavy downpour, with high winds, we can expect yields to drop. There's bound to be some damage. But under normal conditions, our corn yield is up 50 percent. Our soybeans have increased 10 to 15 bushels an acre."

George Davis (left) and his brother Joe discuss the condition of vegetation in a drainage ditch.

Drainage ditches in the Wicomico district attract wildlife.

These Maryland farmers protect their drainage investment by applying related conservation measures. These measures include soil-improving crops to maintain fertility and good soil structure. As farmers who are taking part in the conservation work of their soil conservation districts, they receive technical help from the Soil Conservation Service.

Soils of the Eastern Shore around Salisbury are generally poorly-drained loams and sandy loams of the Pocomoke and Fallsington series.

Let's hear some more from the farmers.

"With drainage, we can grow better crops," Calloway said. "We can plant the crops earlier in the spring. We can keep them in. No more washouts. No more drowning. No more failures because the land is too wet to harvest the crop. Last fall, after one of those hurricanes, we had 10 inches of rain in 24 hours on ground that was already wet. The ditches carried it all off. Without drainage the beans would have been ruined. Without drainage we couldn't raise enough corn around here to fatten a billy goat."

Calloway runs his ditches into a creek on his property. He can drain his whole place without waiting for neighboring farmers to take action

on an interfarm outlet.

Part of the farmland owned by the Davis brothers had drainage ditches installed long ago.

"The ditches ran every which way," Joe Davis said. "Each ditch was dug to drain a small area. One ditch had no relation to the others. Besides, they were seldom taken care of properly. They were cluttered with weeds and brush. So in 1950 we started our present drainage system."

"We had one 16-acre field that had never grown anything," George Davis said. "We couldn't even get into it, it was so wet. Since we cleared and drained it, we've had full soybean production.

"Altogether through clearing and draining we have brought 50 acres into production that were not producing anything. Drainage has brought into sure production 50 acres more which had been questionable—maybe you'd get a crop and maybe you wouldn't. Drainage has greatly improved another 50 acres. Per-acre yields are rising as the drainage system nears completion."

To date in Wicomico County about 365 miles of new drainage ditches have been dug. They help more than 18,000 acres of cropland. Surveys show that 729 more miles of ditches need to be dug to bring the county's farmland into top and dependable production. This estimate includes 13 existing natural waterways that need to be improved. The needed improvements include clearing, grading, and enlarging ditches and natural waterways, and maintaining a road along the ditches in swampland.

These additional 729 miles of ditches would benefit more than 33,000 acres of the county's farmland.

WATER HELPS.—B. C. Fitch, a cooperator with the Florence (S. C.) Soil Conservation District, made 105,000 pounds of tobacco on 49 acres in 1955.

He said: "I would not have irrigated a single time even if I had been equipped for it because I had a perfect growing season. But last year, after two dry years, has convinced me that I can make a good yield of tobacco whenever I put down the fertilizer and have water at the right time." Fitch is going ahead to set up for irrigation when he needs it.

TOMORROW'S BIRTHRIGHT. By Barrow Lyons. 424 pp. 1955. New York: Funk and Wagnalls Company. $5

The author designates this book as: "A Political and Economic Interpretation of Our Natural Resources." That seems to be a satisfactory, concise description of the contents. Though considerable space is devoted to discussing technological developments in resource use and some historical data on resource use and abuse is given, the main emphasis is on the economic and political problems involved, especially those of the 20th century in the United States.

Barrow Lyons had long and varied experience as a journalist before spending nearly 20 years in Federal Government service. He seems to have drawn on all his experience and contacts in assembling the impressive information set forth in this book.

The entire field of resource use and conservation is covered, including soils, timber, wildlife, water, minerals, fuels, etc., though some resources are given more space than others.

One of his main contentions is that proper development, use, and conservation of most natural resources will be determined largely by the turns taken in our political and economic systems as they evolve within the next generation. Obviously, the author thinks that more central government control of basic resources is needed. Yet, he tries to give a fair presentation, sometimes by quotes, of the case for those who think most resource development and use should be left in the hands of private enterprises.

Much of the contents of this book is argumentative. But even the augumentative hypotheses advanced are thought provoking to those interested in the conservation movement.

This is a book that most students of conservation will wish to read and keep as a reference, if only because of the wealth of factual material that has been assembled.

—TOM DALE

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WHAT IS GEOLOGICAL EROSION?—Last year's flood damage in Massachusetts and Connecticut strongly impressed us with the idea that geologic erosion is a cyclical rather than a constant process. Geologic erosion is that wearing down of river valleys, formation of stream terraces, and so on, that occurs—man or no man. Up until 1955, we had got used to things as they were and it looked as though geologic erosion was just history. In fact, one wondered how our landscape got so carved up if nothing ever happened to it.

Now the situation looks more logical. The floods of August and October 1955 cut some stream channels 3 feet deeper, filled up other channels, and created new ones. They laid down deltas of stone and gravel, destroyed some bottom land fields, caved in hillsides, and spread blankets of new soil on the flood plains. In one brief 2-month period, more changes were made in the earth's surface here than in the preceeding 50 years.

But that's not all. The gigantic power of the floods upset protective equilibriums which had withstood smaller storms. Swept away were the natural stone check dams and the gravel stream channel linings. Banks, which had sloped and covered themselves with sod and shrubs, were undercut by the torrents and torn away. It will take a long time for our drainageways to stabilize again, and meanwhile we can expect a period of geologic erosion. These channels will stone themselves up again and nature will heal the scars until new floods start a new cycle. We can expect geologic change to recur in cycles until watershed protection and flood prevention measures blanket the area and the cycle is broken at the flood stage.

—William F. Warren

CONSERVATIONIST ELECTED TO NATIONAL OFFICE.—John D. (Danny) Freeman, area conservationist of SCS for northern Arizona, headquartered at Prescott was elected president of the American Society of Range Management for the current year. He is a charter member of the society and has been active in many ways for several years, particularly in the Arizona Section.

Freeman was born and reared on a farm near Tulia, Tex. He entered New Mexico College of Agriculture and Mechanic Arts in 1931 and upon graduation in 1935 took a job as junior range examiner with the Soil Conservation Service at Safford, Ariz. Since then he has worked continuously in range and soil conservation work in Arizona, New Mexico, Colorado, and Utah.

SURVEY OF HUNTING AND FISHING.—**The first national survey of economic aspects of hunting and fishing got under way Jan. 7, 1956, when agents of the survey firm of Crossley, S-D Surveys, Inc., began personal interviews with hunters and fishermen. The statistics gathered will provide the first accurate nationwide measure of the sports of pursuing game and fish, in terms of number of persons taking part and the amount of time and money spent. The survey will be supervised by the U. S. Fish and Wildlife Service.**

The total contribution of hunting and fishing to the nation's business turnover has been estimated variously from 5 to 11 billion dollars annually. In the past, figures on the number of hunters and fishermen have included only those who bought licenses. In many places minors and old persons are exempt from license requirements; in several states, landowners may hunt or fish on their own property without licenses; and salt water fishermen are not licensed in any state except California.

The survey will report on hunting and fishing during the calendar year 1955. The primary objectives are to determine (1) the number of persons, by age, sex, and licensing, who hunted and/or fished for sport, (2) the amount of time spent on these sports, and (3) the amount of money spent (including all expenditures for items connected directly with hunting or fishing).

RAINMAKER HELPS PROVE A THEORY

(Continued from page 229)

dium- to coarse-textured soils ranging from silt loam to loamy sand the amounts of intake are more than doubled by good ground cover.

The intake rates common on coarse-textured soils such as sand are relatively high, and the increases from improvement in range conditions are relatively small. However, on coarse sands vegetative cover is almost a must for protection from both wind and water erosion.

Hence, it is apparent that good range management that maintains a good ground cover will nearly always produce more forage and check wind erosion.

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